

```

In[1]:= x0 = 0;
x1 = 2.0;
Nmax = 20;
eps = 0.0001;

f[x_] := Cos[x];

If[N[f[x0] * f[x1]] > 0,
  Print["Your values do not satisfy
    the Intermediate Value Property, so change the values."],

  For[i = 1, i ≤ Nmax, i++,

    m = (x0 + x1)/2;

    If[Abs[(x1 - x0)/2] < eps,
      Print["Root is : ", m];
      Print["Estimated error in ", i, "th iteration is : ", (x1 - x0)/2];
      Break[],

      Print[i, "th iteration value is : ", m];
      Print["Estimated error in ", i, "th iteration is : ", (x1 - x0)/2];
    ];

    If[f[m] * f[x1] > 0,
      x1 = m,
      x0 = m
    ];
  ]
];

Plot[f[x], {x, -1, 3},
  PlotRange → {-1, 1},
  PlotStyle → {Red, Thick},
  PlotLabel → "f[x] = Cos[x]",
  AxesLabel → {x, f[x]}]

```

1th iteration value is : 1.

Estimated error in 1th iteration is : 1.

2th iteration value is : 1.5

Estimated error in 2th iteration is : 0.5

3th iteration value is : 1.75

Estimated error in 3th iteration is : 0.25

4th iteration value is : 1.625

Estimated error in 4th iteration is : 0.125

5th iteration value is : 1.5625

Estimated error in 5th iteration is : 0.0625

6th iteration value is : 1.59375

Estimated error in 6th iteration is : 0.03125

7th iteration value is : 1.57813

Estimated error in 7th iteration is : 0.015625

8th iteration value is : 1.57031

Estimated error in 8th iteration is : 0.0078125

9th iteration value is : 1.57422

Estimated error in 9th iteration is : 0.00390625

10th iteration value is : 1.57227

Estimated error in 10th iteration is : 0.00195313

11th iteration value is : 1.57129

Estimated error in 11th iteration is : 0.000976563

12th iteration value is : 1.5708

Estimated error in 12th iteration is : 0.000488281

13th iteration value is : 1.57056

Estimated error in 13th iteration is : 0.000244141

14th iteration value is : 1.57068

Estimated error in 14th iteration is : 0.00012207

Root is : 1.57074

Estimated error in 15th iteration is : 0.0000610352

